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(56) Documents cited

GB 1421084

GB 1160961

US 3610457

(58) Field of search

B5A

Selected US specifications from IPC sub-class B29C

(54) Avoiding shrinkage stresses in moulded container dividing walls

(57) A rotationally moulded plastics container 10 e.g. a vehicle fuel tank has an internal sheet metal dividing wall (11) e.g. a baffle wall comprising a plurality of edge sections 12, 13, 14, 15, which are embedded during moulding in the external plastics wall, and a central wall section (20) which is mounted for relative sliding movement upon the edge sections (12 to 15), to accommodate movement arising from shrinkage of the plastics during cooling after completion of the moulding. The slidable mounting is effected by location of the wall (16) of each edge section, between the wall (11) and parallel retaining members (21) which may either be attached e.g. by riveting or spot welding to the wall (11), or may comprise castellated cut out and bent portions (40) of the wall (Figs. 3 & 4). Gaps (19) at the container corners between adjacent edge sections permit the flow of fuel between opposite sides of each dividing wall (11). Each edge section may also comprise a plurality of sections, spaced apart to permit relative movement between the sections arising from the shrinkage of the plastics.

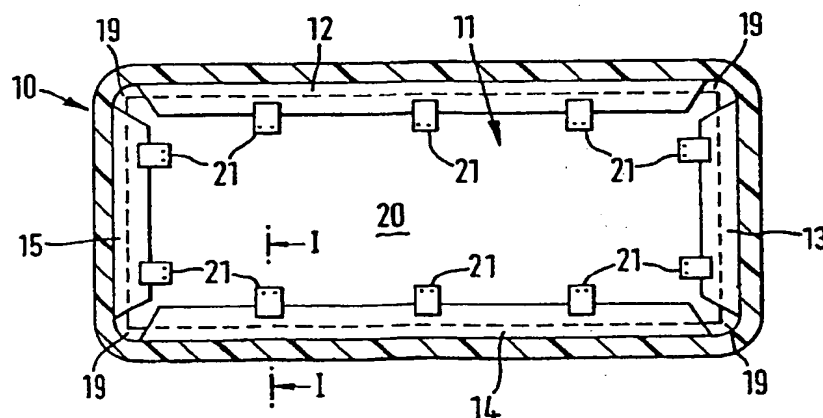


FIG. 1

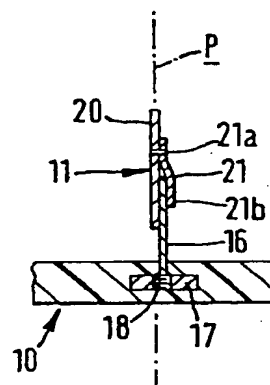


FIG. 2

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The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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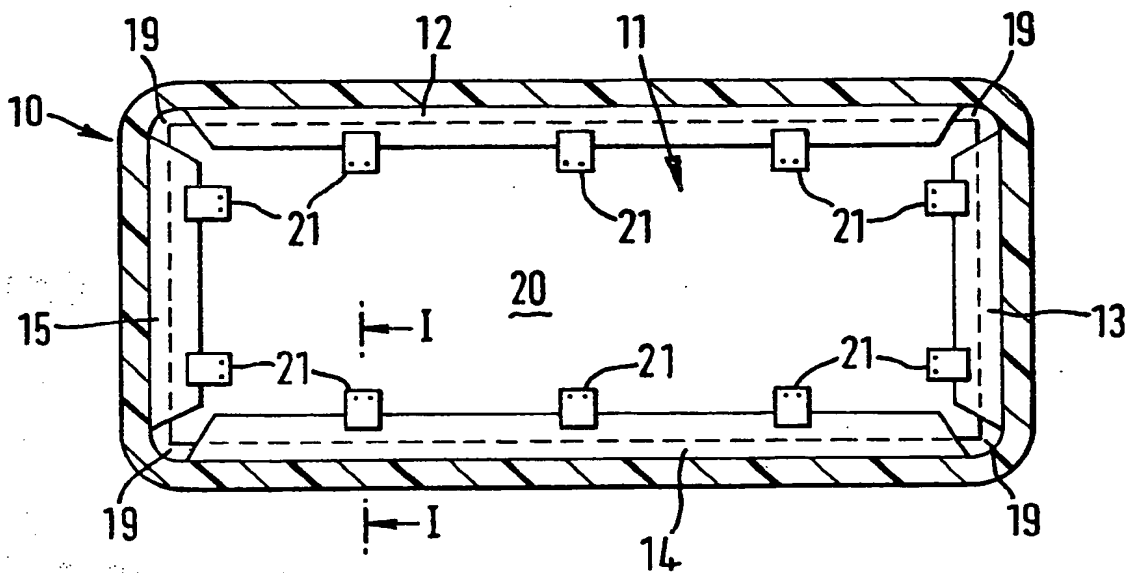


FIG. 1

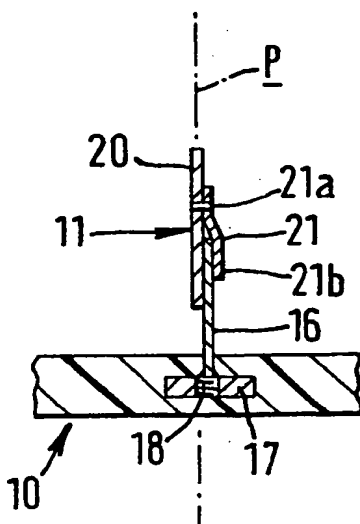


FIG. 2

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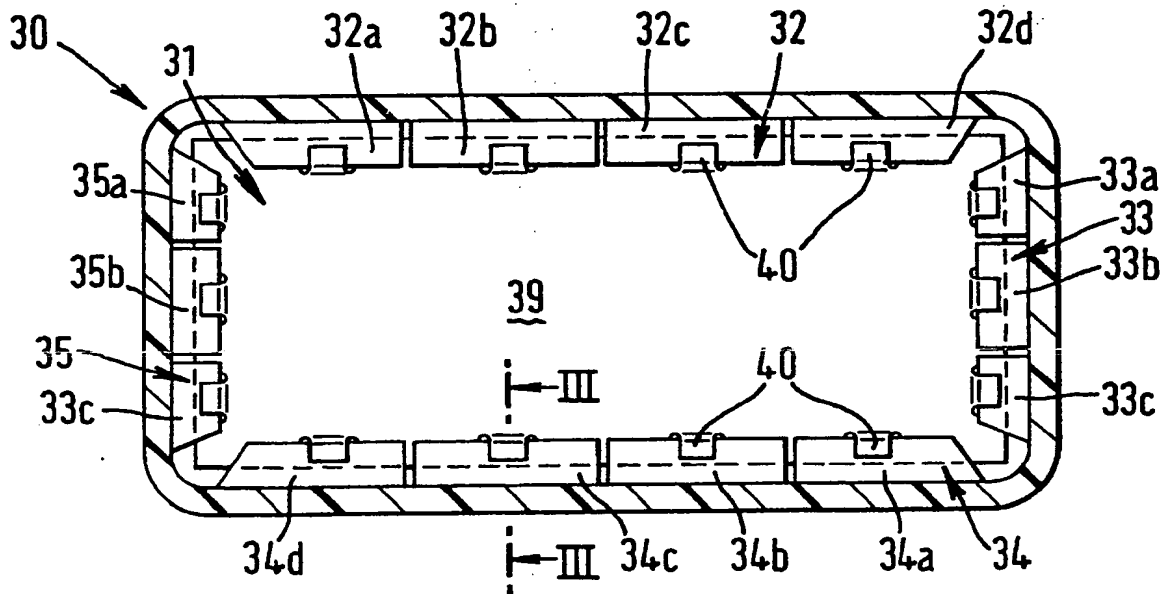


FIG. 3

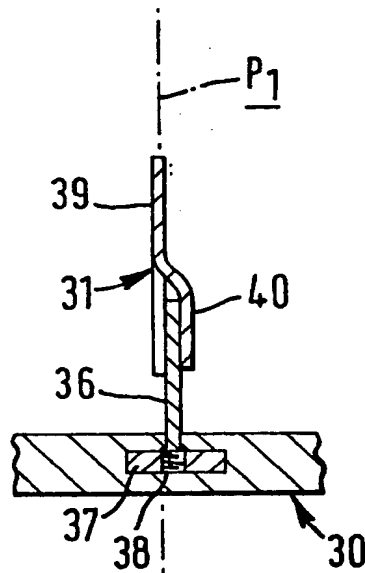


FIG. 4

SPECIFICATION

Rotationally moulded hollow plastics containers

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THIS INVENTION relates to rotationally moulded hollow plastics containers and is particularly concerned with providing a dividing wall such as a baffle wall internally of a rotationally moulded hollow plastics container.

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It is known to produce hollow containers from powdered plastics material by a rotational moulding process in which powdered plastics resin is tumbled in a heated mould tool. There is an increasing requirement for hollow containers produced by this process to be used as liquid carrying tanks for installation in vehicles. In this application it is necessary for the tank to be provided internally with one or more baffle walls to prevent surging of the liquid through the tank when the vehicle in which it is installed is in motion.

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Attempts to provide a baffle wall manufactured from a single sheet of metal located in the mould tool before it is charged with powdered resin have given rise to problems in that after the powdered resin has been fused by heat during the rotational moulding process, the fused resin material shrinks by between three and seven per cent. This shrinkage imposes compressive loads on the baffle wall which cause it to buckle. Also, shrinkage causes the tank walls to be strained over the edges of the baffle wall giving rise to distortion of the tank walls.

UK-A-1,160,961 discloses a process for the production of a moulded thermoplastics container having a partition extending across the container. However, edge portions of the partition are moulded into the walls of the container so as to be integral therewith and a continuous load path is provided across the partition so that it buckles under compressive loads applied to the edge portions when shrinkage takes place after completion of the rotational moulding process unless the partition wall is made of heavy gauge material.

US-A-3,610,457 discloses a rotationally moulded hollow article having a baffle wall provided internally of the article. This disclosure recognises the problem of shrinkage of the article away from the mould onto the edges of the baffle wall thereby giving rise to straining and distortion of the article walls. It is proposed to overcome this problem by supporting the baffle wall internally of the mould prior to the moulding process with absorbent wads of a suitable material and such that the edges of the baffle wall are spaced away from the mould walls by a distance greater than the wall thickness of the article to be moulded. By this means, in the finished article, the edges of the baffle wall are spaced from the internal surfaces of the walls of the article. During the moulding process the absorbent wads wick up

molten resin so that on cooling a rigid plastic column is provided at the location of each wad extending between the article wall and the edge portion of the baffle wall to support it internally of the finished article. These rigid plastic columns provide load paths for the transmission of compressive loads to the edge portions of the baffle wall as shrinkage takes place after completion of the moulding process so that buckling of the baffle wall occurs if it is thin gauge material.

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It is an object of the present invention to provide a rotationally moulded container having an internal dividing wall constructed to prevent buckling of the dividing wall and distortion of the container walls when shrinkage takes place after completion of the rotational moulding process.

Accordingly, the present invention provides a rotationally moulded plastics container including an internal dividing wall having edge portions embedded in the container walls and extending transversely with respect thereto, the internal dividing wall comprising a plurality of sections co-operating with each other so as to be movable with respect to each other in the general plane of the dividing wall.

The internal dividing wall may comprise edge members embedded in internal surfaces of the walls of the container and projecting therefrom internally of the container to slidably engage with a central wall member.

The central wall member may be retained with the edge members, whilst being free to slide with respect thereto in the plane of the dividing wall, by retaining members each having a part attached by suitable means such as riveting to a peripheral edge portion of the central wall member and being bent first outwardly therefrom and then bent to extend substantially parallel thereto so that the edge members are engaged between the central wall member and the retaining members.

In an embodiment of the invention the central wall member is provided around its peripheral edge portion with pressed-out castellated portions and the edge members are engaged between the castellated portions and the central wall member.

Each edge member may comprise a plurality of discrete parts arranged in end to end relationship with spacings therebetween to permit movement of the parts with respect to each other in accommodating shrinkage of the walls of the container during cooling on termination of the rotational moulding process.

The internal dividing wall may be a baffle wall in a container intended for use as a fuel tank or other liquid carrying tank.

The invention will now be further described by way of example and with reference to the accompanying drawings in which:

Figure 1 is a transverse cross-section through a rectangular box-shaped hollow container having a dividing wall in accordance

with one embodiment of the invention;

Figure 2 is a section on line I-I of *Fig. 1*;

Figure 3 is a transverse cross-section through a rectangular box-shaped hollow container having a dividing wall in accordance with another embodiment of the invention;

Figure 4 is a section on line III-III of *Fig. 3*.

In the embodiment of *Figs. 1* and *2* of the drawings a rotationally moulded hollow plastics container comprises a rectangular box-shaped fuel tank 10 having an internal dividing wall 11 which acts as a baffle wall to prevent fuel surging through the tank between its end walls.

The wall 11 has edge members 12, 13, 14, 15 each comprising a longitudinally extending sheet metal strip 16 having a thicker section metal strip 17 attached along one edge by welding so as to be substantially normal thereto as shown in *Fig. 2*. Threaded holes 18 are provided at spaced positions along the length of the metal strip 17 to facilitate attachment of edge members 12, 13, 14 and 15 to the internal wall surfaces of a rotational moulding tool (not shown) before charging the mould tool with powdered plastics resin prior to commencement of the rotational moulding process. After completion of the rotational moulding process the metal strip 17 of each edge member 12, 13, 14 and 15 is embedded in the tank wall as seen in *Fig. 2*. The ends of the sheet metal strips 16 are cut at angles so as to be spaced from each other to provide openings 19 between the corners of the wall 11 and the tank walls. These openings 19 allow a restricted flow of fuel between compartments of the tank on opposite sides of the wall 11.

The wall 11 further comprises a central baffle wall member 20 formed from a substantially rectangular shaped metal sheet of dimensions such that it overlaps the sheet metal strips 16 of the edge members 12, 13, 14 and 15. The baffle wall member 20 is located to one side of the edge members 12, 13, 14 and 15, and is provided around its peripheral portion with a plurality of retaining members 21 which are attached to the baffle wall member by suitable means such as riveting or spot welding. Each retaining member 21 is formed from sheet metal which is bent to provide a portion 21a by which it is attached to the baffle wall member and a portion 21b that is spaced from the baffle wall member to allow the sheet metal strips 16 of the edge members to enter between the baffle wall member and the retaining members 21. By this means the baffle wall member 20 is retained with the edge member 12, 13, 14 and 15 whilst being able to slide with respect thereto in the general plane *P* of the wall 11 to accommodate shrinkage of the fused plastics resin during cooling at the termination of the rotational moulding process.

Referring to *Fig. 3* of the drawings, there is

shown in transverse cross-section a rotationally moulded hollow plastics container 30 having an internal dividing wall 31. The wall 31 comprises edge members 32, 33, 34, 35 extending around the internal surfaces of the walls of the container 30 and embedded therein. In this embodiment each of the edge members 32 and 34 extending along the longest walls of the container are formed by four discrete parts 32a, b, c, d, and 34a, b, c, d, respectively. Similarly, each of the edge members 33 and 35 extending along the shortest walls of the container are formed by three discrete parts 33a, b, c, and 35a, b, c, respectively.

As is seen in *Fig. 4* each discrete part of the edge members comprises a longitudinally extending sheet metal strip 36 having a thicker section metal strip 37 attached along one edge so as to be normal thereto. The metal strip 37 is provided with threaded holes 38 at spaced intervals along its length to facilitate attachment of the edge members to the internal wall surfaces of a rotational moulding tool (not shown).

The wall 31 further comprises a central baffle wall member 39 formed from a substantially rectangular shaped metal sheet of dimensions such that it overlaps the strips 36 of the edge members 32, 33, 34, 35. The central baffle wall member 39 is provided around its peripheral edge portions with pressed-out castellated portions 40 which facilitate engagement of the baffle wall member 39 with the sheet metal strips 36 of the edge members 32, 33, 34, 35, as is shown in *Fig. 4*. This arrangement allows the baffle wall member 39 to slide with respect to the edge member 32, 33, 34, 35, in the general plane *P* of the wall 31 and, at the same time, the sections of each edge member are able to move with respect to each other to accommodate shrinkage of the fused plastics resin during cooling at the termination of the rotational moulding process.

CLAIMS

1. A rotationally moulded plastics container including an internal dividing wall having edge portions embedded in the container walls and extending transversely with respect thereto, the internal dividing wall comprising a plurality of sections co-operating with each other so as to be movable with respect to each other in the general plane of the dividing wall.

2. A rotationally moulded plastics container as claimed in Claim 1, wherein the internal dividing wall comprises edge members embedded in the walls of the container and projecting therefrom internally of the container to slidably engage with a central wall member.

3. A rotationally moulded plastics container as claimed in Claim 2, wherein the central wall member is slidably retained with the edge members by retaining members attached at

spaced locations around the peripheral edge portions of the central wall member and each being bent to extend first outwardly away from the central wall member and then to extend substantially parallel thereto so that the edge members are engaged between the central wall member and the retaining members.

4. A rotational moulded plastics container as claimed in Claim 2, wherein pressed-out castellated portions are provided around the peripheral edge portions of the central wall member and the edge members are engaged between the castellated portions and the central wall member.
5. A rotational moulded plastics container as claimed in any one of Claims 2, 3 or 4, wherein each edge member comprises a plurality of discrete parts arranged in end to end relationship with spacings therebetween.
6. A rotationally moulded plastics container substantially as hereinbefore described with reference to and as shown in Figs. 1 and 2 of the accompanying drawings.
7. A rotationally moulded plastics container substantially as hereinbefore described with reference to and as shown in Figs. 3 and 4 of the accompanying drawings.
8. The new or improved features, combination and arrangements described, shown and mentioned or any of them together or separately.

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